and rusting, the sulfur from the small amount (ca. 0.035%) present in gasoline. Solid hydrocarbons arise from the same sources as the gaseous ones in general. The carbon particles constitute a combustion aerosol, as would be formed in any flame.

Most of the particles in gasoline-engine exhaust are very small, as shown in Fig. 5. Particles as small as 0.01 μ are present in large numbers. Composition varies with size; for example, Fe is found mostly in the larger particles, while Pb concentrates in the small ones, as would be expected from their respective modes of formation.

Diesel engine exhaust particulate contains carbon particles (~50%), paraffin hydrocarbons (including unburned fuel) (~50%), paraffin acids (~1%), H_2SO_4 (~1%), Si(~0.01%), Fe (~ 0.005%), Zn (~0.005%), and traces of Al, Ca, Ni (see Refs. 41, 44); there will be compounds of barium or other elements if smoke suppressants are used. (Refs. 6, 7, 40, 41) The particles tend to be larger than those from gasoline-engine exhaust (see Ref. 6).

A given particle from a vehicle exhaust is unlikely to be simple in composition but rather will generally be a hodge-podge of inorganic and organic material. Because of their vapor pressures, the organic species can generally be expected to condense from the gas phase, normally onto some already-existing site. The amount of particulate matter experimentally found thus depends on experimental conditions. If the sample is collected hot, organic material will be in the vapor phase and will be missed. If the sample is cooled below ~50°C, water droplets will be collected unless the stream is diluted. Some organic constituents will evaporate after collection.

The unburned fuel comprising much of the diesel particulate has a room-

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